

**PROFILE UTILIZATION OF THE SCIENCE LABORATORY IN BIOLOGY LEARNING AT SMA
NEGERI 1 SILANGKITANG**

Erika Lusiana Tobing¹, Ika Chastanti^{1*}, Dahrul Aman Harahap¹

¹Fakultas Keguruan dan Ilmu Pendidikan, Universitas Labuhanbatu

*Corresponding author: chastanti.ika@gmail.com

ARTICLE INFO:

ABSTRACT

Article History

Received December 28, 2020

Revised February 6, 2021

Accepted February 27, 2021

Keywords:

*Biology, Profile Utilization, Science
Laboratory*

Biology is a science that has significant meaning for the world of education in schools. Biology can also be called a method of finding out about nature systematically, so that biology is not only a theoretical mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of finding facts with an actual process through a practicum in the Science Laboratory. The research objective was to determine the management of the Biology laboratory at SMA Negeri 1 Silangkitang. This study uses a descriptive method using a qualitative approach. The data analysis technique was carried out in a descriptive qualitative manner using the Miles and Huberman model. The results showed that the utilization of the science laboratory at SMA Negeri 1 Silangkitang was based on (1) completeness (80%); (2) Storage of tools and materials (75%); (3) Laboratory Maintenance (70%); (4) Provision of laboratories (75%); (5) Laboratory cleanliness (85%). Laboratory utilization at SMA Negeri 1 Silangkitang has been carried out well. Biology teachers carry out practicum in accordance with biology learning materials. Biology teachers attend laboratory training held in universities to develop competence in biology practicum.

This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

How to Cite:

Tobing, E. L., Chastanti, I., & Harahap, D. A. (2021). Profile Utilization of The Science Laboratory in Biology Learning at SMA Negeri 1 Silangkitang. *Jurnal Pelita Pendidikan*, 9(7), 044-049.

INTRODUCTION

The learning activities influence the quality of education and learning carried out by teachers and students in the classroom, in the laboratory, and in other learning areas that are manifested in learning outcomes achieved by students. Effective education is education that is able to optimally facilitate students so that they can contribute positively to national development and development. One of the components of education is facilities and infrastructure ([Mahfudiani, 2015](#)).

In participating in the teaching and learning process in schools, students will get theoretical and practical knowledge supplies. As part of a science group, biology lessons demand to carry out experiments and research to find answers to various phenomena in everyday life. The practicum will be more effective to improve students' expertise in observation and improve skills as well as a means of practicing in using equipment ([Mastika, 2014](#)).

A laboratory is a place for conducting experimental or practicum activities. Students will better understand the subject matter if they are actively involved in the learning process ([Emda, 2014](#)). [Samsudin et al \(2012\)](#) also concluded that practicum increases learning motivation in students. The research results by [Yennita and Zulirfan \(2012\)](#) explain that the intensity of teachers who do a practicum in the laboratory is still very low. This is due to several problems and obstacles experienced by teachers, namely: (1) the intensity of teachers in participating in laboratory training is still low, (2) the availability of practical tools and materials is still lacking, (3) science subject matter is quite dense so that teachers prefer the lecture method, (4) learning objectives are challenging to achieve through practicum (5) particular time is needed for preparation before practicum is carried out, (6) time the implementation of practicum in face-to-face hours is always insufficient, (7) teachers' understanding of the concept and use of practicum tools is still low, (8) teachers find it difficult to design their worksheets, (9) there are no laboratory assistants who can assist the implementation of science practicum.

Biology is a science that has significant meaning for the world of education in schools. Biology can also be called a method of finding out about nature systematically, so that biology is not only a theoretical mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of finding facts with an actual process through a practicum in the

Natural Science Laboratory ([Yennita and Zulirfan, 2012](#)).

Location and Division of Laboratory Space in the Regulation of the Minister of National Education Number 24 of 2007 concerning Standard Laboratory Facilities and Infrastructure must meet the following criteria: 1) The science laboratory room functions as a place for practical science learning activities that require special equipment; 2) The science laboratory room can accommodate a minimum of one study group; 3) The ratio of the minimum area of a science laboratory space of 2.4 m² / student. For study groups with less than 20 students, the minimum laboratory space is 48 m², including 18 m² of storage and preparation space. The science laboratory space's minimum width is five m; 4) The science laboratory room is equipped with facilities to provide adequate lighting for reading books and observing experimental objects; 5) There is a source of clean water; 6) The science laboratory room is equipped with the facilities listed in the laboratory facilities attachment ([Paramita, 2016](#)).

Standard facilities and infrastructure in the laboratory are essential, considering a relationship between facilities and infrastructure with student learning outcomes. These laboratory room factors follow the nature of science learning and teachers' potential in optimizing laboratory use ([Sundoro et al, 2013](#)). Besides, the use and investigation that uses laboratories in teacher education programs that will later be applied in the classroom will encourage teachers to use investigation in learning to students ([Laili, 2018](#)).

SMA Negeri 1 Silangkitang with the road address Silangkitang, Silangkitang District, Labuhanbatu Selatan Regency, North Sumatra Province, has a unique science laboratory room with adequate facilities to support the implementation of practicum, but the utilization is not well implemented. The storage of practicum tools and materials is not neatly arranged and is left just like that. The microscope does not have a particular storage room, and materials in chemical substances are not separated by type. Based on the observations' results, this study aims to determine the use of biological laboratory management at SMA Negeri 1 Silangkitang in laboratory equipment, storage, maintenance, provision, work safety, and laboratory cleanliness.

METHOD

This study uses a descriptive method using a qualitative approach ([Wiersma & Jurs, 2005](#)). The instrument that has been made is used in data collection in the three schools that are the

research subjects, equipped with interviews with the school to complete the data. Data generated from research in qualitative data is presented in descriptions according to actual conditions related to laboratory management at the school (Sari and Dinar, 2018).

The data analysis technique was carried out in a descriptive qualitative manner using the Miles damn Huberman model. This model is carried out in 3 stages: (1) data reduction, namely (a) summarizing data on direct contact with people, events, and situations at the research location, (b) coding, (c) making objective notes, (d) making reflective notes, (e) making marginal records, (f) storing data, (g) creating memos, (h) analyzing between locations, and (i) creating summaries between locations. (2) Display Data by compiling

narrative text. (3) Verification, namely the stage of concluding (Chastanti et al, 2019).

RESULTS AND DISCUSSION

Description of the Utilization of the Science Laboratory at SMA Negeri 1 Silangkitang

Utilization of the science laboratory at SMA Negeri 1 Silangkitang based on (1) completeness (80%); (2) Storage of tools and materials (75%); (3) Laboratory Maintenance (70%); (4) Provision of laboratories (75%); (5) Laboratory cleanliness (85%) (Figure 1) The results show that the use of laboratories is good. Teachers use science laboratories in biology learning. Examples of materials practiced are the classification of plant and animal species, plant and animal tissue, blood group, urine test. Apart from in the laboratory, they carry out practicum in the classroom.

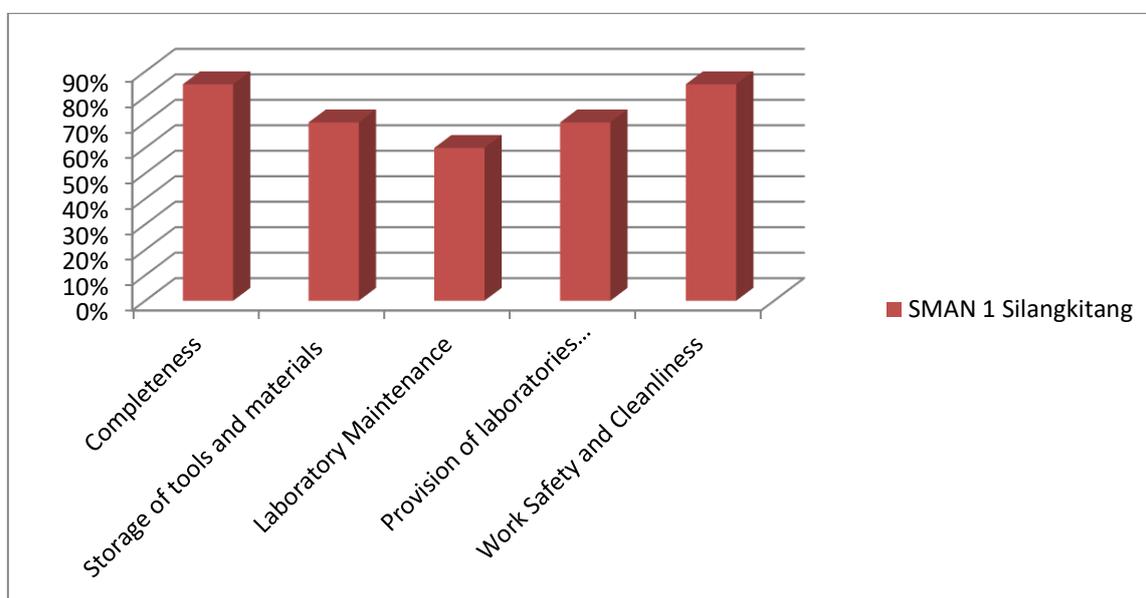


Figure 1. Utilization of the science laboratory at SMA Negeri 1 Silangkitang

The laboratory is well cared for, but students who take care of the laboratory head area, after using the tools, are only obliged to clean the used tools. When the laboratory equipment is damaged during use by the student, the responsible student is the student on condition that all students have to help compensate for the tool's repair. The student looks for suitable materials but only looks for materials such as alcohol.

A laboratory is an essential tool in the learning process. Schools must be able to produce graduates who are competent both in theory and practice and to improve the quality of education. The Government has issued assistance for laboratories (School Operational Assistance) with the hope that schools are able to use it to support the smooth implementation of learning and

achieve effectiveness, efficiency, and quality of science learning at ultimately can improve the quality and achievement of students and schools (Hidayati, 2013).

Laboratory Completeness Analysis

The science laboratory at SMA Negeri 1 Silangkitang in biology learning has standard facilities. The laboratory has autoclave binocular microscopes, animal and plant cell preparations. The science laboratory room area is 8 x 9 meters, and there are many teaching aids for biology learning. The practicum room is the main part of the science laboratory. The science learning process in the practicum room can be in the form of props and demonstrations. The practicum room's learning process must have ample space so

that students can move by paying attention to the number of students and the practicum room area ([Huda, 2011](#)).

Under the Regulation of the Minister of National Education Number 24 of 2007 concerning Standards for Facilities and Infrastructure, laboratory space must meet the following criteria: 1) The science laboratory room functions as a place for practical science learning activities that require special equipment; 2) The science laboratory room can accommodate a minimum of one study group; 3) The ratio of the minimum area of a science laboratory space of 2.4 m² / student. For study groups with less than 20 people, the minimum laboratory space is 48 m², including 18 m² of storage and preparation space. The minimum width of the science laboratory space is 5 m.

A suitable laboratory layout has a separation of the space used in the learning process to get more optimal learning achievement and prevent accidents in laboratory use ([Jones, 2008](#)).

Analysis of Laboratory Equipment and Material Storage

The maintenance of the science laboratory tools and materials at SMA Negeri 1 Silangkitang is still not good because it does not have a particular storage room for tools and materials. Laboratory equipment is only stored in a glass cabinet and put in a box where if this is allowed to continue, it can cause damage to the equipment and materials. It is not separated between hazardous materials and non-hazardous materials according to the mark on each material or chemical substance packaging for practicum materials.

Interviews conducted with biology teachers indicated that the school had a laboratory assistant who helped prepare the tools and materials used during the practicum, and after the practicum ended, the students cleaned the laboratory. The laboratory assistants at SMA Negeri 1 Silangkitang have a high school graduate education background, so they do not understand how to store the laboratory's tools and materials.

Storage should be carried out based on the primary material of the tool. The principles that need to be considered in the storage of laboratory equipment are (1) Safe, namely equipment that is expensive and easily damaged/broken can be stored separately; (2) Easy to search, to facilitate search, tools, and materials are given label paper at each storage area; (3) Easy to pick up, tools and materials that are often used in practicum can be stored in a drawer or cupboard on a demonstration table close to students ([Jufriyah et al, 2019](#)).

Laboratory Maintenance Analysis and Laboratory Administration

The problem that is often encountered in the practicum learning process is laboratory management which includes the procurement process, the process of use, and maintenance. Problems in the procurement process are incorrect tools and practicum materials, as well as problems in maintenance, namely errors in the arrangement of practicum tools and materials ([Wiratma and Subagia, 2014](#)).

Laboratory maintenance based on the results of the interview shows that the laboratory has been well taken care of, that is, there is information in the laboratory for the condition of the tools and materials, if students solve laboratory equipment, then students must replace with the same brand in order to make students more careful in using the tools materials, when the practicum has been completed, the students collectively clean the laboratory.

Laboratory maintenance and administration at this school gets data as much as 60% with materials and practical equipment, always being rearranged after each praktikum, but it should have been realized, but at this time it cannot because of obstacles such as the Covid epidemic period so they rarely do face-to-face practicum.

Maintenance of laboratory equipment and materials should be carried out regularly and recorded so that the history of tools and materials can be seen from purchase, usage to expiration ([Rosada and Raharjo, 2017](#)). The objectives of maintaining laboratory equipment are (1) ready-to-use equipment optimally; (2) extending the use of laboratory equipment; (3) ensuring the safety of students in use; (4) early detection of damage; and (5) guarantee operational readiness ([Jufriyah et al, 2019](#)).

In order to be more effective laboratory administration must prepare the following: (1) laboratory list; (2) discipline of the science laboratory; (3) student attendance list; (4) laboratory activity diary; (5) schedule and list of laboratory equipment users; (6) a list of laboratory equipment and materials inventory; (7) maintenance schedule and planned; (8) evidence of financing sanctions.

Analysis of the Provision/Management and Utilization of Tools and Materials

The provision of laboratories at SMA Negeri 1 Silangkitang is based on the data obtained, namely 70% with the existence of manuals and practicum guides as well as checking the tools to find out whether the tools are still functioning correctly or not the teacher strongly agrees with this because

the practicum will be carried out under procedures and more directed.

The provision and utilization of laboratories are closely related to the managers and users, the facilities, and activities carried out in the laboratory. Strategies that can be used so that the laboratory can be optimally utilized are (1) Addition of laboratory equipment and materials. With adequate tools and materials, at least it meets the standards so that the practicum runs well; (2) Fulfillment of laboratory personnel standards. Laboratory management must be equipped with laboratory personnel with an educational background as laboratory assistants ([Khamidinal, 2009](#)).

The use of the laboratory at SMA Negeri 1 Silangkitang has been carried out well. Biology teachers carry out practicum in accordance with biology learning material. Biology teachers make good use of tools and materials and attend laboratory training held in tertiary institutions to develop biology practicum competencies. The interviews with students indicated that students felt enthusiastic about the biology lab because students better understood the concept of the material in the textbook. The biology teacher provides Student Worksheets after the practicum is completed to master the concepts in theory.

There is only one laboratory assistant at SMA Negeri 1 Silangkitang with a high school education qualification. The laboratory assistant is only in charge of preparing the tools and materials needed for the practicum and closing the laboratory when the practicum is complete. The low quality of Human Resources is a problem that can hinder development. The low quality of education makes it unable to compete globally. Laboratory assistants who do not match their educational background can hinder the use of laboratories. The laboratory assistant's task is to assist the laboratory coordinator in developing and coordinating laboratory functions in the learning and research process for school teachers ([Elseria, 2016](#)).

Analysis of Work Safety and Laboratory Cleanliness

Work safety and cleanliness of space along with laboratory furniture from the data obtained is as much as 80% with fire extinguishers that are easy to operate, hazardous and toxic materials apply separate procedures in their handling as well as the existence of a clean room, trash can, clean sink, and equipment. The neatly arranged laboratory from the statement. The teacher strongly agrees with this, considering that for the

sake of running an excellent practicum-based learning process.

Management of the safety and security of the science laboratory is a shared responsibility. Teachers and students are users of laboratory facilities who need to understand sufficient knowledge and laboratory management matters and safety and security ([Sangi and Adey, 2018](#)). Accidents that may occur during the practicum are (1) burns; (2) injuries due to sharp or blunt objects; (3) injury to the eye; (4) poisoning.

Safety equipment in practicum, namely (1) laboratory coat; (2) Arm protection; (3) Eye protection. The results of interviews with teachers and students stated that teachers and students did not use laboratory coats. The clothes used by teachers and students are only school uniforms for students and the clothes that the teacher wears at the time of practicum, which are the clothes used, are short sleeves. The teacher and the rest also do not use gloves when using the tools and materials.

Work safety and security in the laboratory are critical and need attention. Accidents that occur during practicum reflect users, so it is necessary to increase vigilance in the laboratory ([Rahmantiyoko et al, 2019](#)). Laboratory rooms that meet the standards are one of the factors to avoid work accidents. These requirements include room conditions, room arrangement, completeness of safety equipment. The laboratory room should have good air ventilation so that the process of getting in and out of the air is stable—underarm fresh air circulation in the laboratory room. The availability of work safety equipment is an important thing that must be provided in laboratories, including the city of First Aid and the fire department so that when a work accident occurs, the practicum can be immediately handled. The laboratory should have a good evacuation route, and hazardous chemicals are placed on unique shelves and separated from harmless chemicals ([Yudiono, 2015](#)).

CONCLUSION

The use of the laboratory is good. Teachers make use of the science laboratory in biology learning. Examples of practicum material are the classification of plant and animal types, plant and animal tissue, blood groups, urine tests. Apart from the laboratory, they carry out practicum in the classroom, the laboratory is well cared for, but those who take care of the head of the laboratory, students after using the tools only, must clean used tools. When the laboratory equipment is damaged during use by the student, the responsible student is the student on condition that all students have to help compensate for the

tool's repair. The student looks for suitable materials but only looks for materials such as alcohol.

REFERENCES

- Chastanti, I., Gultom, M., & Sari, N. F. (2019). Analisis Penggunaan Internet Terhadap Karakter Bersahabat/Komunikatif Pada Pembelajaran Biologi. *Jurnal Pelita Pendidikan*, 7 (4), 178 – 184.
- Elseria. (2016). Efektivitas Pengelolaan Laboratorium IPA SMP Negeri 1 Kepahiang Kabupaten Kepahiang. *Jurnal Manajer Pendidikan*, 10(1), 109-121.
- Emda, A. (2014). Laboratorium Sebagai Sarana Pembelajaran Kimia dalam Meningkatkan Pengetahuan dan Ketrampilan Kerja Ilmiah. *Lantanida Journal*, 5(1), 83-92.
- Hidayati, U. (2013). Pemanfaatan Laboratorium IPA dan Bahasa Pada Madrasah Aliyah Swasta. *Edukasi*, 11(1), 94-112.
- Huda, A. (2011). Analisis Pengelolaan Praktikum Biologi di Laboratorium Biologi Universitas Muhammadiyah Malang. *Jurnal Penelitian dan Pemikiran Pendidikan*, 1(1), 75-195.
- Jones, F. (2008). *Apakah Tata Ruang Kelas dan Laboratorium Perlu Diatur?*. Jakarta: Bumi Aksara.
- Jufriyah., Isnah, M., & Kelik, I. (2019). Pemeliharaan dan Penyimpanan Peralatan Laboratorium Kimia. *Jurnal Pengelolaan Laboratorium Pendidikan*, 1(1), 1-7.
- Khamidinal. (2009). *Teknik Laboratorium Kimia*. Yogyakarta: Pustaka Pelajar.
- Laili, R. (2018). Profil Laboratorium IPA/Biologi dan Kompetensi Guru Pengelola Laboratorium SMA Swasta di Kota Pekanbaru. *Perspektif Pendidikan dan Keguruan*, 9(2).
- Mahfudiani, C. F. (2015). Efektivitas Pemanfaatan Laboratorium IPA di SMA Negeri Se-Kabupaten Sleman. (Skripsi). Universitas Negeri Yogyakarta.
- Mastika, N. (2014), Analisis Standarisasi Laboratorium Biologi Dalam Proses Pembelajaran Di Sma Negeri Kota Denpasar, *Journal Program Pascasarjana Universitas Pendidikan Ganesha*, 4(1).
- Paramita, A. H. (2016). Profil Laboratorium dan Pelaksanaan Praktikum Biologi di SMA Negeri 1 Kartasura Tahun Ajaran 2015/2016. (Skripsi). Universitas Muhammadiyah Surakarta.
- Permendiknas. (2007). Permendiknas Nomor 24 Tahun 2007 tentang Standar Sarana dan Prasarana untuk Sekolah Dasar/Madrasah Ibtidaiyah (SD/MI), Sekolah Menengah Pertama/Madrasah Tsanawiyah (SMP/MTs), dan Sekolah Menengah Atas/Madrasah Aliyah (SMA/MA). Jakarta.
- Rosada, D. K. & Raharjo. (2017). Panduan Pengelolaan dan Pemanfaatan Laboratorium IPA. Jakarta: Kemendikbud.
- Rahmantiyoko, A., Sri, S., Fataty, K. R., Sopet., & Slamet. (2019). Keselamatan dan Keamanan Kerja di Laboratorium. *IPTEK Journal of Proceeding Series 4 Seminar Nasional Kimia (SENAKI) XV*.
- Sangi, M. S. & Adey, T. (2018). Keselamatan dan Keamanan Laboratorium IPA. *Jurnal MIPAUNSRAT ONLINE*, 7(1), 20-24.
- Samsudin, A., Suhendi, E., Efendi, R., & Suhandi, A., (2012). Pengembangan “Cels” dalam Eksperimen Fisika Dasar untuk Mengembangkan Performance Skills dan Meningkatkan Motivasi Belajar Mahasiswa. *Jurnal Pendidikan Fisika Indonesia*, 8(1).
- Sari, I. F. & Dinar, D. S. (2018). *Analisis Profil Manajemen Laboratorium Dalam Pembelajaran Kimia di SMA Wilayah Sumedang*. (Skripsi). Universitas Islam Negeri Sunan Gunung Djati Bandung.
- Sundoro, N., Sadia, W., & Suma, K. (2013). Analisis Sarana dan Intensitas Penggunaan Laboratorium Fisika Serta Kontribusinya Terhadap Hasil Belajar Siswa SMA Negeri di Kabupaten Jembrana. *E-Journal Program Pascasarjana Universitas Pendidikan Ganesha*, 3(1).
- Wiersma, W. & Jurs, S. G. (2005). *Research Methods in Education: An Introduction*. Boston: New York.
- Wiratma, I. G. L. & Subagia. I. W. (2014). Pengelolaan Laboratorium Kimia pada SMA Negeri 1 Kota Slingaraja: (Acuan Pengembangan Model Panduan Pengelolaan Laboratorium Kimia Berbasis Kearifan Lokal Tri Sakti). *Jurnal Pendidikan Indonesia*, 3(2).
- Yennita, S. M. & Zulirfan. (2012), *Hambatan Pelaksanaan Praktikum IPA Fisika Yang Dihadapi Guru SMP Negeri di Kota Pekanbaru, Laboratorium Pendidikan Fisika, Pekanbaru*. (Skripsi). Universitas Riau.
- Yudiono. (2015). *Alat Keselamatan Kerja di Laboratorium Kimia*. Jakarta: Gunung Agung.